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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/833,543	04/11/2001	Erik D. Lindskog	A-69116/AJT	4785

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FLEHR HOHBACH TEST  
ALBRITTON & HERBERT LLP  
Suite 3400  
Four Embarcadero Center  
San Francisco, CA 94111-4187

EXAMINER

WANG, TED M

ART UNIT	PAPER NUMBER
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2634

DATE MAILED: 07/11/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

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<b>Office Action Summary</b>	<b>Application No.</b> 09/833,543	<b>Applicant(s)</b> LINDSKOG ET AL.	
	<b>Examiner</b> Ted M. Wang	<b>Art Unit</b> 2634	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 1/24/2005.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-20, 22-25 and 27-43 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 2-10, 15-20, 22-25, and 27 is/are allowed.
- 6) ☐ Claim(s) 1, 11-14, 28-36 and 38-43 is/are rejected.
- 7) ☒ Claim(s) 37 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 October 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)             | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

## DETAILED ACTION

### *Response to Arguments*

1. Applicant's arguments with respect to claims 1-20, 22-25, and 27-43 have been considered but are moot in view of the new ground(s) of rejection.

### ***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 11-14, 28-36, and 39-43 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

(1) In regard claims 11-14 and 39, the limitation of "time reversing and complex conjugating the second symbol streams to form a third symbol stream; and filtering the first symbol stream and the third symbol stream to form decoupled outputs" as recited in claim 11 lines 7-11, has not been taught in the specification. The specification only teaches "Said receiver receiving the symbol streams in the first and second blocks of the transmission frames and time reversing and taking the complex conjugate form of the symbol stream in

the second block and filtering the symbol stream in the first block and the time reversed complex conjugate of the symbol streams in the second block to form decoupled outputs" as recited in page 4 lines 14-18.

(2) In regard claims 28-33, have the same issue as described in the above paragraph (claims 11-14).

(3) In regard claims 34-36 and 40-43, the limitation of "receiving a plurality of symbol sequences each comprising symbols from a plurality of pre-transmission symbol streams" as recited in claims 34 and 41, lines 3-4, has not been taught in the specification.

#### ***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1 and 38 are rejected under 35 U.S.C. 102(e) as being anticipated by Jones et al. (US 6,128,351).

As shown in figures 4, Jones et al. discloses a method for bi-directional demodulation of digital modulated signals comprising steps of:

(1) with regard claim 1:

a method of transmitting a signal having a sequence of symbols (Fig.4

elements 62-64) through at least one channel with inter-symbol interference (column 4 lines 22-38), comprising the steps of:

dividing the sequence of symbols to form a plurality of symbol streams (Fig.4 elements 68-70 and column 6 lines 11-14); and

processing the plurality of symbol streams before transmitting each symbol stream through a channel (Fig.4 elements 68-70 and column 6 lines 11-14), wherein processing the plurality of symbol streams comprises time-reversing at least one of the symbol streams (Fig.4 elements 68-70, column 1 lines 14-29, and column 4 lines 39-58).

(2) with regard claim 38:

wherein processing the plurality of symbols streams further comprises complex conjugating at least one of the symbol streams (Fig.4 elements 68-70, column 1 lines 14-29, and column 4 lines 39-58).

***Allowable Subject Matter***

6. Claims 2-10, 15-20, 22-25, and 27 are allowed.
7. Claim 37 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
8. The following is an examiner's statement of reasons for allowance.
  - The prior art fails to teach an apparatus of Claims 2-10, 15-25, and 27 that specifically comprises the following:

-- The instant application is deemed to be directed to a non-obvious improvement over the invention patented in Pat. No. 6,128,351, 6,594,226, 6,697,641 and Ariyavisitakul, "A Decision Feedback Equalizer with Time-Reversal Structure", IEEE Journal on selected area in communications, vol. 10, No. 3, April 1992. The improvement comprises that during the first block of the transmission frame, applying the first symbol sequence to a first antenna and the second symbol sequence to a second antenna and during the second block of the transmission frame applying the fourth symbol sequence to the first antenna and the third symbol sequence to the second antenna.

### ***Conclusion***

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

10. A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

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the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

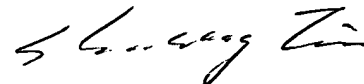
11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ted M. Wang whose telephone number is 571-272-3053. The examiner can normally be reached on M-F, 7:30 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Chin can be reached on 571-272-3056. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Ted M Wang  
Examiner  
Art Unit 2634

Ted M. Wang



**SHUWANG LIU**  
**PRIMARY EXAMINER**